

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listing of claims in the application:

Claim 1 (currently amended): A structure for coupling an electrical signal on a substrate to a waveguide, the substrate ~~having~~ having a substrate layer with a first major surface and a second major surface, the waveguide having a first end, a second end, and a housing disposed between the first and second ends, the housing having one or more walls and defining a longitudinal dimension between the first and second ends along which electromagnetic waves propagate, the one or more walls defining a lip at the first end, the structure comprising:

- a ground ring located on the first major surface of the substrate layer and adapted for contact with the lip at first end of the waveguide, said ground ring enclosing a first area;

- a patch antenna disposed on the first major surface of the substrate layer or within the substrate layer, and located within or below said first area;

- a ground plane disposed on the second major surface of the substrate layer and located opposite to at least said first area;

- a conductive trace disposed on the second major surface of the substrate layer or within the substrate layer; and

- a conductive via disposed in the substrate layer, said conductive via being electrically coupled to said patch antenna and to said conductive trace.

Claim 2 (previously presented): The structure of Claim 1 wherein said ground plane is further located opposite to said ground ring.

Claim 3 (cancelled without prejudice).

Claim 4 (previously presented): The structure of Claim 1 wherein said ground ring comprises a portion that is opposite to a portion of said conductive trace.

Claim 5 (original): The structure of Claim 1 wherein said ground ring is electrically coupled to said ground plane.

Claim 6 (previously presented): The structure of Claim 5 further comprising a conductive via disposed in said substrate layer, said conductive via being electrically coupled to said ground ring and to said ground plane.

Claim 7 (previously presented): The structure of Claim 1 further comprising a capacitive diaphragm disposed on the first major surface of the substrate layer or within the substrate layer, and located between said patch antenna and said ground ring, said capacitive diaphragm comprising conductive material.

Claim 8 (original): The structure of Claim 7 wherein said capacitive diaphragm is electrically coupled to said ground ring.

Claim 9 (previously presented): The structure of Claim 7 wherein said conductive trace has a first portion overlying a portion of said patch antenna, a second portion overlying a portion of said capacitive diaphragm, and a third portion overlying a portion of said ground ring.

Claim 10 (previously presented): A structure for coupling an electrical signal on a substrate to a waveguide, the substrate having substrate layer with a first major surface and a second major surface, the waveguide having a first end, a second end, and a housing disposed between the first and second ends, the housing having one or more walls and defining a longitudinal dimension between the first and second ends along which electromagnetic waves propagate, the one or more walls defining a lip at the first end, the structure comprising:

a ground ring comprising conductive material and located on the first major surface of the substrate layer and adapted for contact with the lip at the first end of the waveguide, said ground ring enclosing a first area;

a patch antenna disposed on the first major surface of the substrate layer or within the substrate layer between the first and second major surfaces of the substrate layer, and located within or below said first area;

a capacitive diaphragm comprising conductive material and disposed on the first major surface of the substrate layer or within the substrate layer between the first and second major surfaces of the substrate layer, and located between said patch antenna and said ground ring;
and

a gap between the patch antenna and the conductive material of the ground ring and capacitive diaphragm, said gap having a non-uniform width.

Claim 11 (original): The structure of Claim 10 wherein said capacitive diaphragm is electrically coupled to said ground ring.

Claim 12 (previously presented): The structure of Claim 10 further comprising a conductive trace disposed on the second major surface of the substrate layer or within the substrate layer between the first and second major surfaces of the substrate layer, said conductive trace having a first portion overlying a portion of said patch antenna, a second portion overlying a portion of said capacitive diaphragm, and a third portion overlying a portion of said ground ring; and

a conductive via disposed in the substrate layer, said conductive via being electrically coupled to said patch antenna and to said conductive trace.

Claim 13 (currently amended): A structure for coupling an electrical signal on a substrate to a waveguide, the substrate ~~having~~ having a substrate layer with a first major surface and a second major surface, the waveguide having a first end, a second end, and a housing disposed between the first and second ends, the housing having one or more walls and defining a longitudinal dimension between the first and second ends along which electromagnetic waves may propagate, the one or more walls defining a lip at the first end, the structure comprising:

a closed-loop strip of conductive material located on the first major surface of the substrate layer, said strip of conductive material comprising a shape which is a substantial mirror image of the lip at the first end of the waveguide;

a first area disposed on the first major surface of the substrate layer and disposed within said closed-loop strip of conductive material;

a first conductive pad disposed on the first major surface of the substrate layer or within the substrate layer between the first and second major surfaces of the substrate layer, and further located within or below said first area, said conductive pad being separated from said closed-loop strip of conductive material;

a second area disposed on the second major surface of the substrate layer and located

opposite to at least said first area;

a first layer of conductive material disposed on the second major surface of the substrate layer and located within said second area; and

a second conductive pad disposed on the first major surface of the substrate layer or within the substrate layer between the first and second major surfaces of the substrate layer, and further located between said first conductive pad and said closed-loop strip of conductive material.

Claim 14 (previously presented): The structure of Claim 13 wherein said first layer of conductive material is further located opposite to said closed-loop strip of conductive material.

Claim 15 (previously presented): The structure of Claim 13 further comprising a conductive trace disposed on the second major surface of the substrate layer or within the substrate layer between the first and second major surfaces of the substrate layer; and

a conductive via disposed in the substrate layer, said conductive via being electrically coupled to the first conductive pad and to the conductive trace.

Claim 16 (original): The structure of Claim 13 wherein said closed-loop strip of conductive material is electrically coupled to said first layer of conductive material.

Claim 17 (previously presented): The structure of Claim 16 further comprising a conductive via disposed through the substrate layer, said conductive via being electrically coupled to said closed-loop strip of conductive material and to said first layer of conductive material.

Claim 18 (cancelled without prejudice).

Claim 19 (currently amended): The structure of Claim 13 wherein a portion of said second pad of conductive material adjoins to a portion of said closed-loop strip of conductive material and is electrically coupled thereto.

Claim 20 (previously presented): The structure of Claim 13 further comprising a conductive trace disposed on the second major surface of the substrate layer or within the substrate layer between the first and second major surfaces of the substrate layer, said conductive trace having a first portion overlying a portion of said first conductive pad, a second portion overlying a portion of said second conductive pad, and a third portion overlying a portion of said closed-loop strip of conductive material; and

a conductive via disposed in the substrate layer, said conductive via being electrically coupled to said first conductive pad and to said conductive trace.

Claim 21 (previously presented): The structure of Claim 8 wherein said ground ring and said capacitive diaphragm comprise conductive material; and wherein said structure further comprises a gap between the patch antenna and the conductive material of the ground ring and capacitive diaphragm, said gap having a non-uniform width.

Claim 22 (previously presented): The structure of Claim 21 further comprising:

a first spacing distance between said patch antenna and said capacitive diaphragm; and
a second spacing distance between said patch antenna and said ground ring; and
wherein said first and second spacing distances are unequal.

Claim 23 (previously presented): The structure of Claim 10 further comprising:

a first spacing distance between said patch antenna and said capacitive diaphragm; and
a second spacing distance between said patch antenna and said ground ring; and
wherein said first and second spacing distances are unequal.